

IN THE CLAIMS:

Please write the claims as follows:

Please cancel claim 11 without prejudice.

- 1 1. (Currently Amended) A method for initiating a peer-to-peer communication ses-
2 sion, the method comprising ~~the steps of:~~
3 attempting a first remote direct memory access (RDMA) read operation directed
4 to a cluster partner having an operating system, the RDMA read operation bypassing the
5 operating system;
6 performing, in response to a successful first RDMA read operation, a first RDMA
7 write operation to the cluster partner;
8 performing, in response to a successful RDMA write operation, a second RDMA
9 read operation directed to the cluster partner; and
10 performing, in response to a successful second RDMA read operation, a second
11 RDMA write operation to the cluster partner.
- 1 2. (Original) The method of claim 1 wherein the step of attempting a first RDMA read
2 operation further comprises the step of issuing a RDMA read operation to the cluster
3 partner requesting a pre-set memory address location that is associated with a status vari-
4 able on the cluster partner.
- 1 3. (Currently Amended) The method of claim 1 further comprising ~~the steps of:~~
2 exchanging a set of peer connection information;
3 passing a set of client information to the cluster partner;
4 creating a set of appropriate communication ports;
5 alerting the cluster partner of a ready status; and

6 alerting a set of clients that the cluster partner is in a ready state.

1 4. (Original) The method of claim 3 wherein the set of peer connection information
2 comprises a version number.

1 5. (Currently Amended) The method of claim 1 wherein the step of passing a set of
2 client information to the cluster partner further comprises ~~the steps of:~~
3 collecting, from a set of clients, the set of client information; and
4 transferring the collected set of client information to the cluster partner.

1 6. (Original) The method of claim 5 wherein the client information comprises a number
2 of communication ports required.

1 7. (Original) The method of claim 5 wherein the set of client information further com-
2 prises an amount of memory requested by a particular client.

1 8. (Original) The method of claim 1 wherein the cluster partner is a storage system.

1 9. (Original) The method of claim 1 wherein the cluster partner is an application server.

1 10.-12. (Cancelled)

1 13. (Currently Amended) A method for initiating a peer-to-peer communication ses-
2 sion, the method comprising ~~the steps of:~~
3 performing a first remote direct memory access read operation directed to a clus-
4 ter partner having an operating system, the RDMA read operation bypassing the operat-
5 ing system; and
6 performing, in response to a successful first remote direct memory access read
7 operation, a first remote direct memory access write operation to the cluster partner.

1 14. (Original) The method of claim 13 wherein the first remote direct memory access
2 read operation is performed over a Virtual Interface connection having a pre-determined
3 and pre-assigned Virtual Interface Number and a pre-determined Fibre Channel ID.

1 15. (Currently Amended) A method comprising ~~the steps of~~:
2 (a) initiating a peer-to-peer communication session which bypasses an operating
3 system on a storage system by attempting a first remote direct memory access read opera-
4 tion directed to a predefined hardware address and a predefined port number, the prede-
5 fined hardware address and the predefined port number previously known to support a
6 RDMA operation; and
7 (b) performing, in response to a successful step (a), a first remote direct memory
8 access write operation directed to the predefined hardware address and the predefined
9 port number.

1 16. (Currently Amended) The method of claim 15 further comprising ~~the step of~~:
2 (c) performing, in response to a successful step (b), a second remote direct mem-
3 ory access read operation directed to the predefined hardware address and the predefined
4 port number.

1 17. (Original) The method of claim 15 wherein the predefined hardware address com-
2 prises a fibre channel identifier.

1 18. (Original) The method of claim 15 wherein the predefined port number comprises a
2 virtual interface.

1 19. (Original) The method of claim 15 wherein the first remote direct memory access is
2 delivered to a predefined memory address storing booting status information.

20. (Currently Amended) A system configured to establish reliable peer-to-peer communication among storage systems of a clustered environment, the system comprising:

a peer process executing on each storage system partner having an operating system; and

a cluster connection manager executing on each storage system partner, the cluster connection manager establishing a reliable peer-to-peer connection between each peer process by connecting to a predetermined port number using a predetermined network address, the reliable peer-to-peer connection bypassing the operating system.

21. (Original) The system of claim 20 wherein the reliable peer-to-peer connection is established without requiring a storage operating system executing on each storage system partner to be fully functioning.

22. (Original) The system of claim 20 wherein the peer-to-peer connection is a virtual interface connection.

23. (Original) The system of claim 20 wherein the peer process is a cluster connection client that requests services from the cluster connection manager.

24. (Currently Amended) A system configured to open an initial peer-to-peer connection over a cluster interconnect, the system comprising:

a storage system having an operating system;

a cluster connection manager executing on the storage system, the cluster connection manager configured to establish a peer connection on a predetermined port number and using a predetermined network address within the storage system the peer-to-peer connection bypassing the operating system; and

a process executing on the storage system, the process configured to use the established peer connection for communication.

1 25. (Previously Presented) The system of claim 24 wherein the peer-to-peer connec-
2 tion is a virtual interface connection.

1 26. (Previously Presented) The system of claim 24 wherein the process executing on
2 the storage system is a cluster connection client that requests services from the cluster
3 connection manager.

1 27. (Previously Presented) The system of claim 24 wherein the process executing on
2 the storage system communicates with a cluster partner using the established peer con-
3 nection.

1 28. (Currently Amended) A system configured to accept the initiation of a peer-to-
2 peer connection over a cluster interconnect, the system comprising:
3 | a storage system having an operating system;
4 | a cluster connection manager executing on the storage system, the cluster connec-
5 tion manager configured to accept a peer connection on a predetermined port number and
6 | using a predetermined network address within the storage system the peer-to-peer con-
7 | nection bypassing the operating system; and
8 | a process executing on the storage system, the process configured to read infor-
9 mation from the established peer connection.

1 29. (Previously Presented) The system of claim 28 wherein the peer-to-peer connec-
2 tion is a virtual interface connection.

1 30. (Previously Presented) The system of claim 28 wherein the process executing on
2 the storage system is a cluster connection client that requests services from the cluster
3 connection manager.

1 31. (Previously Presented) The system of claim 28 wherein the process executing on
2 the storage system reads information from a cluster partner.

1 32. (Previously Presented) The system of claim 28 wherein the information comprises
2 heartbeat signals.

1 33. (Currently Amended) A method comprising:
2 initializing a first remote direct memory access (RDMA) read operation that by-
3 passes the operation system and is directed to a specific cluster partner before a higher
4 virtual interface layer has fully initialized, using a specific port number and a specific ad-
5 dress that support a RDMA operations; and
6 performing a second RDMA read operation directed to a specific cluster partner
7 before a higher virtual interface layer has fully initialized, using a specific port number
8 and a specific address that support a RDMA operations.

1 34. (Currently Amended) A system configured to accept the initiation of a peer-to-peer
2 connection over a cluster interconnect, the system comprising:
3 a storage system having an operating system;
4 a cluster connection manager executing on the storage system, the cluster connec-
5 tion manager configured to initialize a first remote direct memory access (RDMA) read
6 operation that bypasses the operation system and is directed to a specific cluster partner
7 before a higher virtual interface layer has fully initialized and use a specific port number
8 and a specific address that support RDMA operations; and
9 a process executing on the storage system, the process configured to use the estab-
10 lished peer-to-peer connection for communication.

35. (Currently Amended) A computer readable medium for accepting the initiation of a peer-to-peer connection over a cluster interconnect, the computer readable medium including program instructions when executed adapted to:

attempting a first remote direct memory access (RDMA) read operation that by-passes the operation system and is directed to a cluster partner;

performing, in response to a successful first RDMA read operation, a first RDMA write operation to the cluster partner;

performing, in response to a successful RDMA write operation, a second RDMA read operation directed to the cluster partner; and

performing, in response to a successful second RDMA read operation, a second RDMA write operation to the cluster partner.